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HYGIENE IN RELATION TO POULTRY MANAGEMENT * †

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In a recent debate at a poultry conference at which I supported a motion that hygiene was essential for sound economic farming, I was astounded at the number of otherwise enlightened poultry farmers who regarded hygiene as something entirely associated with disease and only to be brought into use when disease was encountered. If we accept the text-book definition that hygiene is " the principles of health " and sanitation is " conditions designed to obviate influences deleterious to health," then the two terms are synonymous with good husbandry.

In poultry farming hygiene is of even greater importance than in other forms of livestock, particularly in view of the relatively large numbers which are now maintained usually in close proximity and under artificial conditions and a high degree of intensiveness. Furthermore, as a result of these conditions infectious and epidemic disease is of greater importance in poultry farming than in other stock; this together with the fact that the relatively small value of the individual fowl as a rule renders individual treatment uneconomic, means that the health of the whole flock is of greater importance than any of its component units. Even if treatment is attempted, it must be remembered that since most of the diseases are of biological origin apparently recovered birds will usually remain as carriers, continuing to spread infection in their excreta and acting as future foci of infection.

The general principles of hygiene are identical with those used in other forms of livestock, although certain points do arise as a result of the method of transmission of certain avian diseases—for example, the egg-borne infections—and also in view of the artificial conditions now so commonly in use on specialised poultry farms. It is impossible in a short talk to cover even the commoner poultry diseases and I think the subject can best be dealt with by briefly mentioning the conditions encountered during the three main phases of poultry farming: (1) incubation, (2) rearing, and (3) egg production and breeding. Control of disease is influenced by the type of husbandry in use: (1) extensive, (2) semi-intensive, and (3) intensive.

Extensive management is usually taken to mean birds maintained with unlimited free range and reared out of doors. Semi-intensive usually refers to out-door brooding with movable folds or restricted grazing, or small colony houses with fixed runs, while intensive management means the maintenance of birds completely indoors such as occurs in battery brooding, battery egg production, indoor brooder houses and intensive laying houses. Broadly speaking, from the point of view of disease control, the semi-intensive method is by far the most easily dealt with. The fact that folds are moved on daily or every other day, gives in most cases, complete control of the commoner parasites, particularly the coccidium which requires a period outside the host. This also holds in the case of helminths. The use of the fold unit also means that the birds are in relatively small groups and that isolation of infected pens can be undertaken readily. To a large extent, fold units are bird proof so that they give some control over the contamination of food and water supplies by wild birds. At the same time, the folding system must be used intelligently as part of the general farming system so that young stock are not folded over the same ground twice in the twelve-month period. It is known, for instance, that the coccidial oocyst will remain viable for at least this time. The usual type of fold will house 20 layers and 30 to 40 growers but depends on level, well-drained ground. Another type of semi-intensive system is the use of a fixed house with solid floors and permanent wire netted runs. Floor space per bird should be about 6 square feet but with this type of management, parasitic infections and other conditions which are likely to arise from fowl sick land are common. With the free range system, the rate of stocking should be 50 to 60 birds per acre.

Although disease is probably less common under completely extensive methods than in intensive, for obvious reasons it is extremely difficult to control when outbreaks do occur, particularly if large fixed houses are in use. Under these circumstances, the best that can be done is heavily to cull the free range flock, removing for slaughter or isolation the clinically affected birds, and to carry out regular inspection and culling of the remainder. The heaviest concentrations of infection invariably occur around the house and food and water troughs. If the house cannot be moved to fresh ground after removal of the clinically infected bird the best that can be done is to dig or plough the heavily contaminated area, removing the top soil, disinfecting the sub-soil with B.O.V. or 10 per cent. ammonia and replacing with fresh soil or clinkers. In some cases, I have seen the heavily infected area shut off with wire netting and a ramp built from the pop-hole of the house to well outside the infected area. The large fixed house with the risk of excessive contamination immediately around the house has been largely replaced by small portable houses which can be moved round the farm. It must be remembered that small houses are no better than large unless they are moved at least once a week. When other houses are placed in the same field they should be evenly spaced. The commonest type of house is the solid floor, allowing 1 square foot per bird.

The completely intensive method of housing the layers in solid floor houses usually means provision of 4 to 5 square feet per bird. The system requires a well-ventilated, rat-

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† The address was preceded by a film, to which at the outset of his remarks, Dr. Gordon made reference by stating that, although intended to deal specifically with bacillary white diarrhoea, the film did to a large extent cover the main points of poultry hygiene. It illustrated not only the sanitary measures necessary for the control of egg-borne infections in incubators and hatcheries but also the steps required to prevent the spread of any infectious disease among mature stock.

proof building. The advantage of battery cages both from the standpoint of husbandry and that of disease control, lies in the fact that the culling of non-productive birds can be automatic. If outbreaks of disease do occur in laying batteries, it is usually advisable to empty not only the infected cages but also the adjacent cages in all directions.

The hygiene pertaining to the various age groups depends, as has already been pointed out, on the type of management in use; for instance, in the incubation period it will have been obvious that with the increase in large-scale hatching, disease control becomes a question of hatchery hygiene. By far the most important diseases of incubation and early rearing are those transmitted *via* the egg, usually by organisms of the salmonella group, and the mortality from these conditions is high.

Infection can be introduced to incubator and hatchery by three main routes—inside the egg itself (as is usually the case in B.W.D.), with eggs introduced from carrier adults, from extraneous sources such as vermin, sexers, etc., and finally, as has recently been shown, by eggs contaminated with *Salmonella* organisms on the outside of the shell. These organisms under conditions of temperature and humidity, penetrate the shell and so infect the embryo.

The importance of incubator infection is due to the great susceptibility of the newly-hatched chick and infection is mainly transmitted from one chick to another at hatching time by chick down, infected shells and other incubator debris, by infected chick membranes—infected chicks are virtually bathed in a suspension of *Salmonella* germs. As the chick dries the down spicules break off and are thrown into the air currents when they are ingested or inspired by other chicks. Infection continues after hatching by the ingestion of food and water contaminated by infected excreta, by dirty chick boxes, sexers' hands, contaminated second-hand utensils and so on. It has also been shown that other species of animals such as house flies are capable of transmitting infection. One infected chick can be expected to infect up to 100 contact chicks in the same machine and depending on the distribution of these chicks in different batches, it has been shown from the film that one of the best methods of incubator disinfection is by fumigation with formaldehyde. The recommended amounts are 1½ oz. formalin and 1 oz. potassium permanganate per 100 cubic feet. It has been demonstrated recently, however, that these amounts do not always give satisfactory results and experiments have shown that four times these amounts can be safely used provided that the eggs are not exposed to the gas during the 24th to 84th hour of incubation, and that with this strength, 100 per cent. kill of the organisms can be expected in any part of the machine in 20 minutes. The usual programme adopted is, firstly, to fumigate the setting compartment so as to expose each setting of eggs during the first 24 hours of incubation. As setting is carried out weekly, this means that each lot of eggs will be exposed three times. Secondly, to fumigate the hatcheries after transferring the eggs but before hatching is started, and thirdly, to fumigate the hatching compartment after the hatch has been taken off but before cleaning has started. Recently some experimental work has been carried out with new aerial disinfectants such as propylene and tryethylene glycol and other aerosols.

The fact that it has been shown that the *Salmonellae*, other than *S. pullorum*, are usually transmitted on the outside of the shell has led to investigations into the possibility of disinfecting the egg shell before setting. Washing of dirty eggs is definitely contraindicated as on most farms the same cloth will be used from egg to egg. Experiments have shown that washed dirty eggs are usually more heavily contaminated than dirty eggs.

The real solution to this problem appears to be improvement in clean egg production, the provision of ample nest accommodation, frequent renewal of clean nest litter, frequent collection of eggs in clean containers and the storage of eggs in well-ventilated, dry, vermin-proof rooms. If possible, dirty eggs should not be used for hatching but experiments are being carried out in an attempt to find some method of dipping eggs in disinfectant solutions—5 per cent. Dettol has been shown to be effective. Some hatchery outbreaks have been shown to originate from infected vermin and hatcheries should as far as possible be vermin-proof. This aspect should be borne in mind, as certain of the so-called rat virus poisons are prepared from *Salmonella* organisms and they cannot be recommended for use on poultry farms.

By far the commonest disease of chick rearing is coccidiosis. Although it has been shown that this disease can be successfully treated by the use of saturated solutions of sulphamethazine in the drinking water, the disease can to a large extent be controlled by good hygiene. This depends largely on the fact that the parasite is not immediately effective when excreted and must pass a period of at least 48 hours outside the host. The use of movable fold units, wire floors, batteries, easily swept up litter which can be renewed frequently, are all satisfactory methods of controlling infection. The parasite requires warmth and humidity for sporulation and improved brooder house ventilation will delay sporulation. The use of wire platforms for holding the drinking troughs, the frequent removal of the feeding and water troughs so that damp areas do not occur, are all helpful in delaying and reducing multiplication.

Aspergillosis, due to a fungus found in mouldy or musty litter or food-stuffs, is fairly common in chicks. Food containers should be emptied completely and cleaned out—not just topped up, when mouldy food will accumulate in the corners.

Chicks are particularly susceptible to vitamin deficiencies and it is obvious that in choosing the housing, attention should be given to the maximum exposure to sunlight. If intensive methods are used then the food must be fortified with vitamins and minerals.

The same main facts are applicable to older birds, most of the infectious diseases being transmitted by food and water contaminated with infected excreta. It is obvious that food and water containers must be kept scrupulously clean and every effort made to cut down infection by the removal of possibly infected droppings. The method by which this is done will depend on the form of management in use, *e.g.*, use of wire floors, movable droppings trays which can be scrubbed easily, fold units, dropping pits and so on. Where bedding is used as in intensive houses, a thin layer which can be frequently replaced is preferable if the birds have access to range. Deep litter used in the completely intensive laying house depends on the use of dropping pits wired off from the birds. Incidentally, the dirty litter and manure should not be composted near the poultry house since certain of the parasites, particularly coccidia, can be wind borne.

The intermediate stages of most of the ecto-parasites are spent in cracks and crevices in the walls of the house. For this reason, the fitments of the poultry houses should be fitted into slots and readily movable for regular cleaning. Particular attention should be paid to the regular cleaning of the nest boxes which are usually strongholds of parasites. Walls

should be cleaned with a wash made of hot water and soft soap or sprayed with a paraffin emulsion. D.D.T. and Gammexane can be incorporated in such sprays.

For the treatment of external parasites D.D.T. or Gammexane can be used as a dusting powder of 0·5 per cent. strength, or may be sprayed as a watery suspension of D.D.T. (2 per cent.). Gammexane (which gives better results against mites) does, however, taint the egg, and food and water should be removed while treatment is in progress. An alternative method is to paint the perches with 40 per cent. nicotine sulphate.

Birds, during the course of life, pass from one type of housing to another and this should never take place until the new accommodation has been cleaned. The following general lines are recommended. Spray the interior of the house and litter with an approved disinfectant, then scrape the walls and remove the scrapings to the manure heap. If there is any question of disease having been present, these scrapings should be burned or buried in quicklime. The interior of the house should then be scrubbed with hot water containing 4 per cent. washing soda and finally the house should be re-sprayed with disinfectant.

Poultry farmers tend to rely too much on disinfectants and it has been said that "if cleaning is properly carried out there will be no germs left to disinfect," and that "if cleaning is not done, most disinfectants will be inefficient." It should be remembered that the most efficient disinfectant for the destruction of the coccidia is a 10 per cent. solution of ammonia.

The carrier adult is a great danger in poultry farming and if possible a separate rearing ground should always be kept for young stock; similarly, special care must be taken with birds newly returned from other sources—laying trials, shows, etc. They should be isolated for at least 21 days and during that period can be tested for B.W.D. and tuberculosis. Second-hand utensils and swill are common sources of infection; the latter, if possible, should never be brought on the premises uncooked. It is extraordinary how commonly one sees the same containers which have been used for the uncooked swill being used to distribute the boiled material. There is little doubt that the live diseased fowl is the greatest source of infection and all ailing and unthrifty birds should be removed at the first instance of ill health as certain diseases require special hygienic methods. It is essential that in all cases of mortality authoritative diagnosis should be undertaken. Poultry farmers should be encouraged to use the available veterinary services and to do it quickly.

One writer has summarised the main points of hygiene under the title of "A sanitary programme for the poultry farm":—

1. Avoid traffic in live birds.
2. Buy stock only from known sources.
3. Keep young stock away from older birds.
4. Dispose of dead birds properly by burning or burial.
5. Do not allow contaminated equipment to be brought on your premises.
6. Discourage visitors from other poultry farms.
7. Isolate all poultry returned from other premises.
8. Dispose of sick birds for slaughter.
9. Eliminate rats, mice and other pests.
10. Treat droppings as potentially infective.
11. Keep different species of birds segregated.
12. Do not sell birds known to be diseased or to have been in contact with disease.

Discussion

Mr. J. C. Buxton, after expressing his thanks to Dr. Gordon for a "very entertaining and helpful address and film," said he thought it would help members present if Dr. Gordon would run over the salient symptoms of fowl pest—so that Divisional Inspectors would not have such justification for complaint (in the future) as they now had, due to faulty diagnosis or lack of diagnosis by the person reporting suspected cases. At Sutton Bonington they had done a *post-mortem* examination on a fowl which had revealed no other bacteria than streptococci and he would like to ask Dr. Gordon if there was any condition in poultry known to be a streptococcal infection. He wished to know, further, if Dr. Gordon still attached as much significance as he had done in the past to salmonellosis in public health and whether the varieties of *Salmonella* were still on the increase.

Mr. A. Houston: He too had enjoyed the film and address, but noted that the doubtful or pin point reaction was not shown in the agglutination test in the film. He thought that emphasis should be put on the speediness of a positive reaction. With regard to fowl paralysis virus which he understood had a long period of incubation, he would like to ask where the infection arose.

Mr. Houston mentioned a disease of young birds—which arose in autumn when they were turned out on to stubble—which was quite common in those parts—pullet disease. Could Dr. Gordon say a few words about this condition?

Mr. Greenwood: He had often wondered how the embryos in incubators stand the high concentration of formaldehyde gas which many people used as routine on the 16th day. He asked whether any satisfactory antigens were available for the *Salmonellas*—or was cross-agglutination so frequent as to render them useless?

He was surprised that Dr. Gordon had not mentioned the spectacular success with the use of sulphamezathine in coccidiosis. He had noted this great success—but on some farms where this treatment had been used the productivity and hatchability of eggs twelve months later had fallen appreciably. Would Dr. Gordon put this down to any specific action of the sulfamezathine or was it just coincidence?

He was perturbed to hear of the "new" sub-clinical form of pest; it seemed that this was just one more item to add to their many troubles over this condition.

Mr. Campbell thanked Dr. Gordon for his paper and said that the only point he would like to raise concerned blackhead in turkeys—was there any really satisfactory treatment or prophylactic against this disease?

Mr. Smythe recalled living on eggs and milk for many months and wondered if there was as much risk of salmonellosis as Dr. Gordon had indicated.

He had been struck by the great scarcity of tuberculosis amongst the fowl which they had in for *post-mortem* examination. He wondered where all the avian tubercle bacilli actually lived and whether it was as widespread as we had been led to believe.

Mr. Smythe asked how long coccidial oocysts were viable, and if fowl were moved from a piece of land from time to time, how long would need to elapse before it would be safe for them to return to that piece of land?

Finally, with regard to fowl paralysis, could this not be prevented to some extent by breeding from older stock when they had shown resistance to this disease?

The Reply

Dr. Gordon, in reply, first complied with Mr. Buxton's request for the salient symptoms of fowl pest, as follows:

Symptoms of fowl pest (Newcastle disease type): The occurrence in a flock of a mortality of up to 80 per cent. within two to three days following the exhibition of symptoms was in itself very indicative of pest. The heads of the birds drooped, the comb and wattles became cyanosed, there was a frothy profuse diarrhoea and respiratory distress causing a high-pitched squeaky cough—which was almost diagnostic. *Post-mortem* examination showed petechiae in the coronary groove and in the visceral aspect of the sternum, abdominal fat and around the glands of the proventriculus.

There was a type which was more chronic, where nervous symptoms might predominate: the bird showed circus movements of the head, bending the head down—even to the extent of the beak resting on the ground. The mortality of this form was about 20 to 30 per cent. and a high percentage made a complete recovery.

During 1948 a new sub-clinical form was discovered where the only sign was a drop in egg yield: these cases of course were

discovered during the process of tracing back from a more obvious outbreak by the H-I test: apart from these circumstances the disease could not be diagnosed from the symptoms shown.

With regard to salmonellosis: this he thought was definitely increasing and new types were constantly being discovered. A big increase occurred in poultry after the introduction to this country of sprayed dried egg. Certain birds were carriers and transmitted the infection *via* the egg. The mortality rate with this disease varied enormously. For instance, with *S. thompson* it might be 10 per cent. on one farm and as high as 80 per cent. on the very next farm. The acuteness and virulence varied with the mode of infection—it was particularly high in incubator infection because here the chicks were more susceptible and the organisms were living under as near optimum conditions as possible. In infection of extraneous origin, *e.g.*, from dried egg, the acuteness and virulence were not so high. He considered that the public health angle of salmonellosis must be faced: the organisms were particularly pathogenic to children and invalids and the risk of infection was high from such egg products as cream filling, ice cream, mayonnaise, etc.

As regards streptococci, there had been odd reports of isolated instances of streptococcal infection in poultry but so far as he knew, no published report on the condition existed in this country.

Replying to Mr. Houston, Dr. Gordon pointed out that the film was made for laymen and that no attempt had been made to confuse the issue by showing doubtful reactions in the film. The antigen these days was an alcoholic extract and the reaction in a positive case was almost spontaneous—in fact it was safe to say that if no reaction occurred within 30 seconds to one minute it was *not* pullorum disease. As regards pin-point reactions, in infected flocks they referred usually to newly infected birds with low blood titre—and retest in two to three weeks might show marked reactions in these cases. In non-infected flocks they were usually non-specific in character. In practice this type of reaction was met with in less than 2 per cent. of bloods tested.

In fowl paralysis the infection might be egg transmitted and chicks could be infected by adults and by carrier birds. Selective breeding had been tried from resistant healthy stock (*i.e.*, birds which were free after exposure for 300 days)— but there was the risk of breeding from a carrier.

Pullet Disease was a nephrotoxicosis and urates accumulated in the serous membranes of heart, liver and other visceral organs. The theory that it was caused by feeding new wheat had been exploded: he personally thought it was a virus. In U.S.A. it was considered possibly to be a potassium deficiency and muriate of potash was fed in food and drinking water. The majority died of impacted crops due to a depraved appetite. One treatment was to boost up the carbohydrate ration.

Answering Mr. Greenwood, it was a fact that undried live chicks could be exposed to formaldehyde gas without ill effect—it had been tried as a means of euthanasia of day-old cockerels and had failed completely, so that the eggs would be well able to stand the gas.

As regards antigens to *Salmonella*, this was rather a forlorn hope because of the cross agglutinins. The danger point of cross infection was when the incubator doors were opened, all the dust, feathers and debris, etc., being wafted into the air at this time.

With regard to coccidiosis, sulphamezathine gave a 60 per cent. recovery rate and treated chicks were not again susceptible to the same strain. It should be used for five days only—longer than that might lead to toxicity, the toxic effects being on the clotting time of the blood and sexual precocity.

Replying to Mr. Campbell, Dr. Gordon said that the arsenical preparations were used following their use in other protozoan infections. By the time clinical symptoms showed it was often too late to use any treatment, but they appeared to be of use in the early stages if infection could be diagnosed at that time. He added that the use of phenothiazine to destroy the *Heterakis* had no effect whatsoever on blackhead.

Answering Mr. Smythe, Dr. Gordon emphasised that the dangers of Salmonellosis came from egg products rather than from shell eggs—although duck eggs were of some danger *per se*.

He agreed that tuberculosis was a relatively rare disease in poultry and was confined chiefly to the backyard hen. He personally doubted whether there was any correlation between avian reactors in the tuberculin test in cattle and tuberculosis in contact poultry.

Coccidial oocysts were viable up to one year, depending on the weather; a hard winter would account for most of the oocysts.

SOME NOTES ON SPECIMENS FOR LABORATORY DIAGNOSIS

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In the course of our work in connection with laboratory diagnosis, we have too often encountered the specimen that has proved unsuitable. Sometimes, the fault could be ascribed to improper handling but, more often, it was the result of injudicious selection of material. Many veterinary practitioners have represented to us that they would welcome information and advice on the material needed for laboratory diagnosis, especially if that information were presented in a manner that made it readily available. It is hoped that this request will be satisfied in some measure by the publication of these notes.

1. Selection of the Specimen

It is impossible to state any fixed rule other than that the specimen should be representative of the disease and that it is always better to submit several specimens from the same premises. In the case of the smaller animals such as poultry, pigs and lambs, select one or two animals which have just died and also one or two that are in different stages of illness.

2. Identification of the Specimen

The manner of identifying a specimen is of the utmost importance if only because the laboratory worker depends upon it so much for his knowledge of the case. Even if it does seem to require considerable clerical effort on the part of the practitioner or a member of his staff, we must emphasise that identification of a specimen should always be complete and that anything short of this is worthless—just as much to the sender as it is to the man in the laboratory.

Adequate identification of a specimen should contain information pertaining to:—

(1) The name and full address of the veterinary surgeon.
(2) The name and address of the owner.
(3) Description of the animal.
(4) Clinical history.
(5) Type of animal enclosures.
(6) Number of animals affected.
(7) Mortality- or morbidity-rate.
(8) Type of preservative, if any, used on the specimen.

It is a moot point whether that information should be enclosed with the specimen or be sent under separate cover. The latter procedure, of course, does give warning of the existence of a specimen so that, in the event of undue delay in its delivery at the laboratory, appropriate inquiry can be made.

There was no really satisfactory method of destruction on the ground.

Fowl Paralysis.—Some farmers did not like pullet breeding although in these days of progeny testing it was essential to breed early. It was possible by selective breeding to develop a fowl paralysis resistant strain.

3. Conveyance of the Specimen

Probably, most specimens are sent to the laboratory by post, and in the majority of cases delivery is effected without incident or undue delay. There are parts of the country, however, in which the practitioner will find that speedier transit is to be had by bus, rail or air service. The last, in fact, has proved of exceptional benefit in Western and Northern Scotland.

In the United Kingdom, the conveyance of pathological specimens by mail is subject to certain regulations of the General Post Office and, as these regulations are not as widely known as, perhaps, they might be, it may be permissible to quote from the *Post Office Guide*, October, 1948.

Articles Sent for Medical Examination or Analysis

Deleterious liquids or substances, though otherwise prohibited from transmission by post, may be sent for medical examination or analysis to a recognised medical laboratory or institute, whether or not belonging to a public health authority, or to a qualified medical practitioner or veterinary surgeon by letter post, but on no account by parcel post, under the following conditions:—

(1) Any such liquid or substance must be enclosed in a receptacle, hermetically sealed or otherwise securely closed, and this receptacle must itself be placed in a strong wooden, leather or metal case in such a way that it cannot shift about, and with a sufficient quantity of some absorbent material (such as sawdust or cotton-wool) so packed about the receptacle as absolutely to prevent any possible leakage from the package in the event of damage to the receptacle. The packet so made up must be conspicuously marked *Fragile with care* and bear the words *Pathological specimen*.

(2) Any packet of the kind found in the parcel post, or found in the letter post not packed and marked as directed, will be at once stopped and destroyed with all its wrappings and enclosures. Further, any person who sends by post a deleterious liquid or substance for medical examination or analysis otherwise than as provided by these regulations is liable to prosecution.

(3) If receptacles are supplied by a laboratory or institute, they should be submitted to the Postal Services Department, General Post Office, London, E.C.1, in order to ascertain whether they are regarded as complying with the regulations.

Note.—A comparatively inexpensive, and satisfactorily absorbent, packing-material is the cellulose wadding, marketed under the trade name of "Cellosene," that is manufactured by Messrs. Robinson & Sons, Ltd., Wheat Bridge Mills, Chesterfield, Derbyshire. The firm has a London office at King's Bourne House, 229/231, High Holborn, W.C.1.

4. Preservation of Specimens

Quite the best way to preserve any specimen is to deliver it at the laboratory as part of a living body but, since this is an ideal so often impossible to realise, preservation becomes a problem of practical importance. The laboratory worker requires of any method of preservation that it be equal to the task that may be demanded of him; the practitioner seeks a method that is at once efficacious and simple. Many as are the methods now available, it is a fact that each has its limitations as well as its special applications.

The oldest and the most popular method of preservation depends upon the use of chemical substances. Of these, the most widely known is formol or formalin, if only because it is the most generally useful fixative for specimens intended for histopathological studies. For this purpose, commercial formaldehyde is diluted either with water or, better still, with normal saline solution to yield a fluid that contains 3 to 10 per cent. of formaldehyde. Because it delays the formation of formic acid, itself harmful to tissues, neutralisation of the formaldehyde is advantageous and can be effected very simply by adding to the commercial solution enough marble chips to form a thick layer on the bottom of the bottle. Especially if it be kept in a very cold place, commercial formalin tends to become turbid from the formation of a white precipitate of paraformaldehyde, but this change does not appear to do much harm to tissues.

Small pieces of tissue should be immersed in, approximately, 20 times their volume of 10 per cent. neutral formol-saline. Penetration by the fixative is more complete if the pieces are cut into slices, not exceeding 0·5 cm. thick. Large specimens may be wrapped in a cloth soaked in formalin and, outwardly, in some non-absorbent material such as cellophane, preferably, after immersion for 24 to 48 hours in 10 per cent. formol-saline solution.

Alcohol, either in absolute ethyl form or as methylated spirits, is said to be particularly good for tissues in which it is desired to demonstrate bacteria and it is quite essential, of course, for the preservation of glycogen, which is so readily soluble in water. Alcohol both fixes and hardens and, *per se*, causes considerable shrinking of tissues and cellular elements. It is not superior to formalin.

Blood serum, for use in serological tests, is excellently preserved by adding chloroform, phenol or tricresol to a final concentration of 0·25 per cent., 0·5 per cent., or 0·3 per cent., respectively. Not less useful in this respect is merthiolate (sodium-ethyl-mercuri-thiosalicylate) in a dilution of 1 : 10,000.

The foregoing preservatives are of the bactericidal type and are useful when routine parasitological examination or bacteriological examination by microscopy only is required. When the chief aim of preservation is to subdue bacterial multiplication, bacteriostatic chemicals may be employed and, especially if the object is to preserve the virus-content of any material, the latter should be placed in neutral glycerol, either concentrated or diluted by an equal volume of normal saline solution. Boric acid, powdered borax and sodium chloride have some preserving value and, in an emergency, may suffice for small organs or portions of tissue removed during autopsy, provided that a detailed bacteriological study is not to follow. The specimen should be immersed in a very large quantity of solution. It should be noted, however, that neither borax nor boric acid will prevent decomposition if the specimen has had contact with the intestinal tract or been soiled by faecal or intestinal material.

Refrigeration is a useful method of preserving material that is intended for bacteriological examination but is not so satisfactory where histopathological examination is concerned. The specimen should be placed in a suitable receptacle which is then packed in a watertight container, filled with cracked ice and sawdust. One of us (M.A.S.) has found that a very good method is to attach to a sample a thin rubber balloon filled with water and frozen in a refrigerator.

5. Specimens for the Diagnosis of Bacterial Disease

Abscess.—Material is best recovered by means of two sterile swabs which, after impregnation with pus, are replaced in the sterile test-tubes. In the laboratory, one swab is used for direct microscopical examination and the other is employed for culture or for animal inoculation, if necessary.

Actinomycosis and Actinobacillosis.—For the diagnosis of these diseases the following specimens are required: (*a*) smears of pus and crushed granules from pus, (*b*) swabs of pus, and (*c*) portion of affected tissue.

Anthrax.—In animals suspected to have died of anthrax the ordinary autopsy should not be made; thus contamination of the adjacent soil by blood and tissue fluid is prevented and the risk of infection of other animals thereby minimised. From cases in cattle and in sheep there should be collected (*a*) two films of blood, and (*b*) two swabs of blood. In the pig and the horse, however, death commonly occurs before many organisms are present in the blood so that material for diagnosis should consist of a superficial lymphatic gland and

smears of any inflammatory fluid that may be encountered, especially in the region of the neck or just under the skin. Smears of blood or of inflammatory fluid are best fixed as soon as they have been made—in which case, if heat be used to fix, it should be lightly applied so that the bacterial capsules are not destroyed.

Blackquarter.—The laboratory diagnostic procedure entails (1) direct microscopical examination, (2) cultural examination, and (3) animal inoculation. The requisite material consists of (*a*) two smears from the freshly cut surface of affected muscle, (*b*) a portion of muscle, about 2 inches square, together with a regional lymphatic gland, packed in 50 per cent. glycerol, and (*c*) swabs from lesions.

" *Black Disease.*"—*Vide* Infectious necrotic hepatitis.

Braxy.—The general laboratory procedure is as for blackquarter and the material required is (*a*) a portion of abomasal lesion, (*b*) a piece of liver and (*c*) a sample of peritoneal fluid, the two former packed in salt or borax. As in the case of most clostridial diseases, the diagnosis of braxy cannot be confirmed bacteriologically unless the examination is undertaken within an hour or two of death. This is because of the rapid invasion of the carcase by putrefactive bacteria, including *Cl. septique.*

Brucellosis.—In veterinary practice, the most widely used method of diagnosis is the agglutination test for which is required a sample of blood serum that has not been spoiled by haemolysis. If the result of the test be negative or inconclusive, the test should be repeated in 15 to 30 days.

In bovine brucellosis a tentative diagnosis may be forthcoming by microscopical demonstration of *Br. abortus* especially aggregated in clumps within polymorphonuclear cells, in films of foetal gastro-intestinal contents, placental cotyledons or utero-vaginal discharge; such demonstration, however, should always be supported by cultural examination. The complete range of samples needed in bovine cases includes (*a*) blood, 5 to 10 c.c., in amount, (*b*) the foetal stomach, (*c*) portion of placenta, and (*d*) swabs of utero-vaginal discharge. Material least likely to be contaminated comprises: the foetal gastric contents, foetal lungs, subchorionic inflammatory fluid, deep cotyledonary tissue and end-milk.

Enterotoxaemia.—This collective term covers those conditions which are probably more widely known as lamb dysentery, " pulpy kidney " and " struck." All are attributable to absorption from the small gut of toxins elaborated by the different types of *Cl. welchii.* An essential part of laboratory diagnosis is determination of the presence of toxin in the small intestine (ileum, especially) of afflicted animals but, unhappily, a real problem is presented by the rapidity with which toxin tends to disappear from the intestinal contents after death. Quite the best material for submission to the laboratory is a moribund lamb and, next in preference, is the entire length of the small intestine, ligated at both ends.

At the very least, the length of intestine submitted should be 2 feet and the ends should be tied securely so that the contents do not escape.

Glanders.—A sample of blood, 5 to 10 c.c. in amount, will provide serum for a complement-fixation test which has proved most accurate in the diagnosis of chronic glanders. Serum may also be submitted to the agglutination test which is of value in the early stage of the disease. Otherwise, laboratory diagnosis depends upon the cultural and biological demonstration of glanders bacilli in nasal discharge, discharge from " farcy buds," lung or spleen so that swabs of discharge or portions of tissue may be submitted. In the case of tissues, one portion should be preserved in 50 per cent. glycerol-saline and another in 10 per cent. formol-saline, the latter being for the histological demonstration of glanderous nodules.

Infectious Necrotic Hepatitis.—The material required for laboratory diagnosis is a portion of liver that shows areas of necrosis.

Johne's Disease.—It has long been customary to submit samples of faeces for the diagnosis of this disease in the living animal, a procedure which has the advantage of furnishing material for concurrent parasitological and general bacteriological examinations that often yield information of differential diagnostic value. Johne's bacilli, however, are not always demonstrable in faeces so that, separately, there should be supplied as well either one or two fragments torn from the rectal mucosa or material that has been scraped off that mucous membrane by the finger-tips. Specimens of rectal mucosa are likely to yield positive results only if the disease has advanced to the stage at which the terminal portion of the large intestine has become involved. When the comprehensive laboratory examination proves completely negative, further material should be submitted one or two weeks later. *Post-mortem*, the terminal part of the ileum with its associated lymph-nodes affords probably the most satisfactory specimen of tissue. Even in cattle, the suitability of a portion of gut for bacteriological examination cannot be estimated by the degree of corrugation of the mucosa alone for, in not a few cases, either diffuse reddening or scattered petechiae on the mucous surface constitute the only manifestation of Johne's disease.

Leptospirosis.—Whilst outbreaks of disease caused by *Lepto. icterohaemorrhagiae* continue to be infrequently encountered in kennelled sporting dogs, infection by *Lepto. canicola* is widely prevalent in the canine population of this country. Both species of *Leptospirae* may occur in the urine but, whereas in less acute cases *Lepto. icterohaemorrhagiae* becomes localised in the liver with ultimate manifestations of severe jaundice, *Lepto. canicola* invades the kidneys and such invasion may be associated with either a symptomless state or a syndrome that is not yet clearly definable. Laboratory diagnosis of both forms of leptospirosis is by the agglutination test together with demonstration of *Leptospirae*, especially in the urine. The latter secretion is best obtained by the catheter and must be delivered at the laboratory with the least possible delay if the motility of *Leptospirae* is to be appreciable. *Leptospirae* quickly perish in acid urine so that the specimen should be suitably buffered or, if the circumstances of the case permit, the acid reaction of the urine should be corrected by placing the patient on an alkali-producing diet. At *post-mortem* examination, blood together with portions of kidney and liver should be taken for laboratory examination. If blood suitable for a serological test cannot be obtained, fluid from a serous cavity or cerebrospinal fluid should be submitted.

Listerellosis.—Precise diagnosis of this condition can be made only by recovery of the causal organism. In domestic mammals, *Listerellae* occur most often in the brain and liver but, in poultry, they are not infrequently present in the blood, peritoneal and pericardial fluids and necrotic foci of the myocardium and liver. In both the rabbit and the fowl there is often a striking increase of monocytes in the circulating blood.

Mastitis.—Whether the sample of milk is from a single quarter or is a composite one, it must be taken with completely aseptic precautions if it be intended for bacteriological examination. The first few streams of milk should be discarded and the sample then drawn directly into a sterile wide-mouth bottle, held as nearly as possible in the horizontal position so that contaminating material from the cow or the hands is prevented from entering the sample bottle. Neither the teat nor the fingers should be allowed to touch the lip

of the bottle. For bacteriological examination by culture, about two fluid ounces of secretion are required but, when biological examination is necessary, the amount of the specimen should be not less than four fluid ounces. As a rule, a preservative is not added but, if the milk is being consigned from a remote district during a period of warm weather, it may be of advantage to add boric acid, 5 grains per 4 ounces of specimen. When a sample cannot be despatched immediately, it should be kept at a temperature of 0° to 5° C.

Pyelonephritis.—During life, a sample of urine, 20 c.c. or more in amount, is necessary, whilst for *post-mortem* diagnosis the kidneys should be sent.

Swine Erysipelas.—Diagnosis is by demonstration of bacilli in the blood of living acute cases and in the heart and other viscera after death. The complete range of specimens required by the laboratory comprises: (*a*) films of blood, (*b*) swabs of blood, and (*c*) spleen, heart, kidney and an articulation with associated long bone. Bacilli may also be recoverable from cutaneous lesions.

Salmonellosis.—Nearly every species of animal is susceptible to *Salmonella* infection and, broadly, the order of frequency of such infection is: birds, pigs, cattle, sheep, horses, dogs and cats. In mammals, the condition usually develops as a gastro-enteritis and is often attended by fatal bacteriaemia. In non-fatal cases, however, localisation is common and usually involves the liver, spleen, lungs and kidneys where necrotic foci are the most frequent manifestations. In the mare and the ewe *Salmonellae* occur chiefly in the uterus and the cleansing may then exhibit haemorrhages, gelatinous infiltration, necrosis of villi and, even, slightly purulent placentitis. In both the calf and the pig, pneumonia is sometimes the only feature of some *Salmonella* infections that are ordinarily enteric in type. Occasionally, cow's milk contains *Salmonellae.*

The foregoing facts must be kept in mind during selection of material suitable for laboratory diagnosis.

In general, however, specimens should consist of: terminal small intestine, mesenteric lymph-nodes, spleen, liver with intact gall-bladder and any local lesions already indicated.

By virtue of their small size, birds can be sent intact to the laboratory and, if such delivery can be effected personally, living as well as dead birds should be submitted. Although avian salmonellosis is quite often generalised, there are some noteworthy examples of localisation, thus: in the ovary of survivors of outbreaks of pullorum disease; in duck eggs infected by *Sal. enteritidis* and in the swollen wing-joints of squabs in some cases of infection by *Sal. typhi-murium.*

In all species of animals, diagnosis of the *Salmonella* carrier state is by the agglutination test for which the usual sample of blood is required by the laboratory. In recent years, a modification of this test applicable to samples of whole blood on the farm has been extensively used in the diagnosis of pullorum disease.

Tuberculosis.—This is one of the few diseases in which a diagnosis can often be made by microscopical examination alone. The simplest method is to stain a film of sputum, milk, pus or other pathological material by Ziehl-Neelsen's stain. The most accurate test for the presence of living tubercle bacilli is, of course, inoculation of guinea-pigs (and rabbits, if the type of tubercle bacillus must be established) and, when milk is submitted for this purpose, the amount of the sample should be not less than four fluid ounces. When tissues are submitted for diagnosis, some pieces should be sent in 10 per cent. neutral formol-saline and others in 50 per cent. glycerol-saline to allow of histological examination and animal inoculation, respectively.

Tetanus.—Bacteriological diagnosis of this condition is often difficult and sometimes impossible but the clinical picture is fortunately so characteristic that bacteriological examination is seldom called for. If a wound be present, smears and deep swabs from it should be sent to the laboratory.

6. Specimens for the Diagnosis of Virus Disease

(Laboratory diagnosis of virus diseases requires the use of any, or all, of the following methods:—

(1) Demonstration of specific tissue changes,
(2) Demonstration of cell-inclusions, elementary or otherwise,
(3) Experimental reproduction of the disease in animals and
(4) Serological reactions.)

Aujeszky's Disease.—*Vide* Pseudo-rabies.

Dermatitis, Contagious Pustular.—One or two dead, or moribund, lambs or, at least, a portion of skin with unopened vesicular lesions is required.

Distemper, Canine.—For the present, reproduction of the disease in ferrets is the only method of confirmatory diagnosis and for it spleen offers, probably, the most satisfactory material, if it be impossible to submit the entire carcase. Certain authorities claim that diagnostic of canine distemper is the demonstration of inclusion bodies in the epithelial cells of the respiratory passages and the urinary bladder, which tissues require to be forwarded under refrigeration.

Encephalomyelitis, Equine.—The European type of this disorder, commonly known as Borna disease, is characterised by the presence of inclusion bodies (Joest-Degen bodies) in the ganglionic cells of the hippocampus and in the olfactory lobes. Thus, the brain of the animal preserved in 50 per cent. glycerol saline should be forwarded to the laboratory.

Encephalitis, Fox.—Virus occurs most regularly in the central nervous system and spleen so that, if a carcase cannot be sent, brain and spleen should be submitted.

Encephalomyelitis, Pig.—This condition is also known as Teschen disease (from the name of the district in which it was first encountered). Gross lesions do not occur and virus is most regularly demonstrable in brain-tissue.

Fowl Paralysis.—Diagnosis depends greatly upon the histopathological examination of the sciatic or the brachial nerves and their related plexuses and spinal nerve-roots, whether or not gross changes are there appreciable. Since removal of these nerves entails some time spent on careful dissection, the entire body should be sent.

Influenza, Swine.—Virus occurs in the nasal secretion, tracheobronchial exudate, lungs and bronchial lymph-nodes. Because the disease occurs in young pigs, moribund animals or carcases offer very suitable specimens.

Laryngotracheitis, Avian.—Although it is sometimes to be found in the spleen and liver, virus occurs in highest concentration in the respiratory secretions. Highly significant at autopsy are the signs of acute haemorrhagic inflammation in the larynx and the upper third of the trachea. Such changes are accompanied by abundant mucus or blood on the surface of the affected mucosa or, in older cases, by caseofibrinous exudate which sometimes forms a hollow cast extending the full length of the trachea.

Louping-Ill.—During the initial stage of mild fever, virus is present in the blood but, later, it becomes localised in the brain, spleen, mesenteric and popliteal lymph-nodes and sciatic nerves. In fatal cases, brain provides the best material for laboratory diagnosis and spleen is not infrequently satisfactory. Blood is useful in atypical or subclinical cases.

Leukaemia, Avian.—Precise diagnosis of this disease depends upon microscopical examination, even more of the blood than of haemopoietic organs. Hence, the moribund bird is to be preferred to the dead one.

Panleucopenia, Feline.—This condition is known also as feline agranulocytosis since it is characterised by neutropenia which is complete, or almost complete, at the height of the fever. It is accompanied by a varying degree of lymphocytopenia and of eosinopenia. Diagnosis of clinical cases, therefore, is greatly assisted by a total and a differential white cell count of the blood, samples of which latter are useless if they are allowed to coagulate. *Post-mortem* diagnosis is assisted by histopathological examination of lymph-nodes and haemopoietic organs. According to some authorities, inclusion bodies occur in the epithelial cells of the intestinal mucosa and in the spleen, lymph-nodes and bone-marrow.

Plague, Fowl.—Under British law, this disease is included with Newcastle disease under the designation, " Fowl Pest," and laboratory diagnosis is mainly biological as far as fatal cases are concerned. *Ante-mortem* diagnosis is possible by means of serological tests for which the usual sample of blood is required.

Pox, Avian.—In the domestic fowl, the clinical diagnosis of pox is easy when verrucose lesions develop on the head or, in the pigeon, when such lesions occur on the legs and toes. Confirmatory diagnosis may be necessary when (1) in the fowl, morbid changes are limited to the nasal passages or the buccal cavity or, more rarely, these changes are of septicaemic type and (2) in the pigeon, lesions of a necrotic type develop only at the corners of the mouth. Again, in the canary, pox is usually generalised although it is quite often characterised by, *inter alia*, haemorrhage into the skin and serosae and massive oedema of the sub-epithelial connective-tissues. Inclusion bodies, both large and very small in size, are demonstrable in the epithelial cells of lesions in the fowl and pigeon and in the blood-platelets and histiocytes in the canary.

Pseudorabies.—Known also as Aujeszky's disease and, popularly, as " mad itch," this condition often occurs in subclinical form in the pig but, in the other species affected, it begins as a mild, or a severe, fever during which phase virus is present in the blood. Subsequent invasion of the nervous system results in an encephalomyelitis that is manifested in cutaneous hyperaesthesia and paralysis, notably of the glossopharyngeal nerve. Laboratory diagnosis is biological for which purpose brain-tissue is most useful in frankly clinical cases.

Psittacosis.—If only because of its danger to man, in whom outbreaks of fatal pneumonia have not seldom occurred, this disease should be treated with especial care. In acute cases in birds (parrots, parrakeets, budgerigars, canaries, finches and pigeons) virus occurs in the blood and all the internal organs but, especially, in the nasal discharge and faeces. Diagnosis can be established only by laboratory methods which include microscopical demonstration of cell-inclusions in the liver and spleen, animal inoculation and a complement-fixation test.

Rabies.—British law requires that cases of suspected rabies in animals be confirmed at the Veterinary Laboratory, Ministry of Agriculture and Fisheries, New Haw, Weybridge, Surrey. Laboratory diagnosis is by microscopical demonstration of inclusion (Negri) bodies and by inoculation of rabbits, for which purposes brain-tissue is most satisfactory. Small animals should be decapitated as nearly as possible to the base of the neck and the head, wrapped in a formolised cloth or packed in ice (especially during warm weather), despatched to Weybridge by the speediest possible route. Large animals may be similarly treated or, better still, the brain and part of the spinal cord may be removed and sent in ice.

" Virus " Abortion of Mares.—Diagnosis of this disease can be supported by histopathological examination of the liver and spleen and demonstration of inclusion bodies in the liver and, sometimes, the lungs. The disease can be reproduced in pregnant guinea-pigs. An aborted foetus provides the most suitable material for confirmatory diagnosis or, alternatively, foetal liver, lungs and heart should be submitted.

7. Specimens for the Diagnosis of Fungous Disease

(The existence of myotic infection is established by direct microscopical examination and by culture.)

Dermatomycoses.—Lesions should first be cleansed with cotton-wool soaked in alcohol or chloroform. In all cases, specimens should be taken from the active margin of a diseased area and forwarded in a sterile container. Short, broken hairs should be selected by means of flat-tipped forceps and specimens of cuticle should be snipped off with the scissors rather than scraped off by a scalpel. If lesions are moist, some of the exudate also should be included.

Mycoses of Internal Organs.—In this country, as yet, aspergillosis of the lungs is the form that is most frequently encountered. Serious outbreaks have been experienced in chicks reared in brooders when the need for confirmatory diagnosis is emphasised by the resemblance of aspergillotic lesions to those of pullorum disease.

Otherwise, aspergillosis occurs mainly in the domestic fowl and many species of wild birds, and only rarely does it affect mammals. In cases of suspected mycotic disease, specimens of tissue should be collected and sent exactly as for bacteriological examination together with special warning of the possible fungous nature of the disease.

8. Specimens for Haematological Examination

Routine blood examination is now firmly established in veterinary medicine as an aid to clinical diagnosis, quite apart from its critical application in conditions such as leukaemia and feline agranulocytosis. Such examination covers estimation of haemoglobin, volume of packed cells, total red and white cell counts and a differential white cell count and requires an amount of blood of not less than 2·5 c.c. That quantity is obtainable without difficulty from the larger animals and from big dogs but is not so easily secured from cats and the smaller dogs. If only a small amount of blood is available, the packed cell volume is omitted. Clotted samples of blood are useless for haematological examination and, to prevent clotting, an anticoagulant must be employed in accurately measured amount. Laboratories will supply small bottles containing the requisite amount of anticoagulant but, to provide for those occasions on which such containers may not be immediately available, it may be said that coagulation of 10 c.c. of blood is prevented by 20 mgm. of potassium oxalate, or 16 mgm. of sodium oxalate, or 1 to 2 mgm. of heparin.

As a general rule, samples of blood must be examined as soon as possible after their withdrawal from the body lest degenerative changes supervene in the corpuscles. If the examination cannot be made within about one hour, the clinician should furnish as well several thin films of blood, fixed by immediate immersion in methyl alcohol (industrial spirit or absolute alcohol will *not* do).

9. Specimens for Blood Chemical Examination

Oxalated samples of blood are required for the following tests: sugar, non-protein nitrogen, urea, cholesterol, creatinine and plasma chlorides. The amount of oxalate is as given in the preceding section and should not be exceeded because excess of oxalate interferes with a number of blood chemical tests. Clotted samples are necessary for: calcium, phosphorus and phosphatase estimations, Van den Bergh reaction, icterus index and determination of serum proteins.

10. Specimens for Parasitological Examination

A fresh specimen free from soil, stones or bedding, is required and should be forwarded in a watertight container, but if such a receptacle be not available and the nature of the material will allow, the specimen may be wrapped in waxed paper. If the laboratory is located at a considerable distance away, preservation may be necessary and can be effected by refrigeration or by the addition of one part of 10 per cent. formalin to four parts of faecal material. Chemical preservation is contra-indicated in the case of samples in which larvae or motile protozoa have to be demonstrated.

11. Specimens for Chemical Examination

In all cases of suspected chemical poisoning, there should be submitted portions of liver, kidneys and heart and, separately, a section of small intestine and stomach with their respective contents. The specimens should be packed in ice and sawdust in watertight containers. A sample of urine is useful since it will give an indication of whether or not the poison has passed through the creature. Solid ruminal contents are useful in cases of suspected hydrocyanic acid poisoning.

12. Samples of Blood for Serological Examination

Samples of blood for serological examination are quite often found to be useless because they have become haemolysed. Haemolysis may be caused by: (1) The use of a wet needle or wet syringe, (2) the presence of chemical substances in the syringe or the container, (3) extremes of heat or cold, (4) unnecessary agitation after the blood is in the tube and (5) decomposition of the clot in consequence of massive bacterial contamination.

REPORT ON FOOT-AND-MOUTH DISEASE IN MEXICO

Continued progress amid an atmosphere of international goodwill is reported by Dr. C. U. Duckworth, California Assistant State Director of Agriculture, regarding the campaign to eradicate foot-and-mouth disease in Mexico.

Dr. Duckworth, member of the National Advisory Committee on foot-and-mouth disease, has just returned from an inspection trip to Mexico with other members of the committee. His report included the following comments:—

During the first six months of this year, about 18,000,000 head of animals have been vaccinated, either the first, second or third time. It is planned to step up the total vaccinations to 20,000,000 head for the second six months of this year.

Almost all the animals in the infected zone have been vaccinated the first time. About 5,000,000 animals have been vaccinated the second time and about 100,000 have been vaccinated the third time.

It is significant that the disease has not occurred among the 5,000,000 animals vaccinated the second time.

The international commission, Mexican and American, is deserving of the highest commendation.

It is believed that by the end of the year sufficient data will be available to make a complete evaluation of the entire programme and arrive at a reasonable estimate of results on which to base future plans.—*Vet. Med.*

* * * *

Weekly Wisdom

"*Mankind was living in a spiritual twilight, and none knew whether dawn or dusk would follow. It seemed that civilisation was at the end of an age and none could say what the next would be. Strength of spirit, courage, and independence were the great needs. Nothing was more dangerous than to sit like a mouse watching an oncoming snake—paralysed and reduced to a state of frustration. . . .*"—General Smuts, speaking in London on June 7th, 1949.

QUESTIONS AND ANSWERS

The submission of questions for inclusion in this column will be welcomed; they can relate to any aspect of veterinary work. For purposes of record, each question is numbered, and those submitting questions are required to furnish (not for publication) name and address.

Answers to readers' queries represent exclusively the personal opinions of the writers, and criticism of the replies will be appreciated.

All communications should be addressed to the Editor.

Treatment of Scouring in Calves

Q. 324.—*What is the most efficient and economical treatment of calf scour?*

A.—As the great majority of cases of scouring in calves appear initially to be associated with a disturbance of digestion brought about by environmental rather than disease factors, the most effective and economical treatment to introduce is to starve the calves for a day, give them boiled milk and water 1 : 3 the next day, half and half the third day and return to boiled milk on the fourth day. The identification of any specific agent, however, may indicate a treatment which in these circumstances would be more economical, of which the best to date appears to be phthallylsulphathiazole.

. . . . . .

Technique for "Heart Beat Without Respiration" in the New-born

Q. 325.—*What is the technique to be adopted when a foal or calf is born with heart beating but makes no respiratory effort?*

A.—The standard technique employed by the respondent is as follows:—

(1) Clearance of the nasal passages.

(2) Artificial respiration. This is carried out by moving the upper front leg to and fro with one hand, while applying intermittent pressure on the ribs with the other. It is also as well to have an assistant rubbing the calf or foal if the dam is unable to perform this function by licking. The time-honoured method of blowing into the mouth and nostrils has the double action of clearing the passages and providing a CO_2 stimulus, and should not be neglected.

It has been shown (Haldane) that the respiratory centre is stimulated by increased tension of CO in the blood. It would therefore be reasonable practice to attempt to introduce CO into the blood-stream by administering it from a "Sparklet" or similar apparatus intratracheally *during artificial respiration*. In the tissues CO will diffuse into the blood-plasma, since the partial pressure of CO in the tissues is higher than that in the blood-plasma (Marshall & Halnan). CO_2 might with advantage also be administered subcutaneously.

. . . . . .

Cause of Abortion in a Bitch

Q. 326.—*What is the cause of abortion in bitches about three weeks from the end of the gestation period? A kennel-man has a bitch which he suspects has just slipped pup. He tells us that before the war one out of every four bitches used to abort. The bitch in question carried to full time last pregnancy but only one of the pups survived. Is there any method of vaccination against this abortion?*

A.—Abortion in the bitch may arise, as in other species, from various causes, *e.g.*, disturbance of nutrition, hormone imbalance, trauma or infection.

Nowadays, it is generally believed that the syndrome characterised by lowered fertility, abortion and death of puppies, shortly before or after birth, is due to infection. Dr. Tom Hare has associated it with the presence in bitch and pups of a *Beta-haemolytic streptococcus*.

Whatever the infective agent may be the writer believes that it is introduced prior to birth and that it persists, in the absence of treatment, in females (and possibly in males),

throughout life, being subsequently transmitted to a large percentage of the offspring. In this way many well-known strains of dogs have been completely wiped out and many kennels closed down.

Fortunately, the organism or organisms involved, appear to be penicillin-sensitive. The writer has succeeded in breeding bitches, believed to be barren, by a series of injections of penicillin (100,000 U. in wax-oil suspension daily for four days) immediately prior to service, half-way through pregnancy and during the few days prior to parturition. Puppies which show signs of infection within a few days of birth, as exemplified by "seagull" cries, coldness and disinclination to suckle, are given 30,000 units of an aqueous solution of penicillin, repeated in twelve hours. Recovery is usually spectacular.

Some practitioners have also observed abortion in bitches which have survived a mild attack of, or been in contact with, hard pad disease, even if in the latter event the bitch herself has shown no clinical symptoms of the disease.

It is also essential in cases of reported abortion to be absolutely satisfied that a pregnancy has been in existence; experienced breeders and kennelmen are often misled into believing abortion has occurred in bitches which show a marked degree of pseudo-pregnancy.

* * * * *

Correspondence

Disease of Pigs in Ireland

Sir,—With reference to Mr. Carter's letter in your issue of September 10th, this condition—so-called "gut oedema"—has been recognised in Northern Ireland for some 15 years, but it is only in the last few years that it has become so prevalent.

At this laboratory we have carried out numerous transmission experiments but so far we have not been able to demonstrate with certainty the presence of any infectious agent.

It is inevitable that comparisons should be made between "gut oedema" and "Teschen disease." This latter condition has become widespread on the Continent of Europe where it was first described in Czechoslovakia in 1929. It is fairly well established that Teschen disease is due to a virus which is found in the central nervous system of the affected pig. However, in contrast to gut oedema, Teschen disease can be readily transmitted by appropriate experimental methods and this disease also produces well-defined pathological changes in the central nervous system. No such changes have been described in gut oedema. Clinically, it is true, the two conditions resemble one another, but existing experimental data would indicate that the disease of pigs in Ireland is a separate entity.

Yours faithfully,

Ministry of Agriculture for Northern Ireland, D. Luke.
Veterinary Research Division,
The Farm, Stormont, Belfast.
September 13th, 1949.

INFECTED MILK

A circular (No. 87/49) sent by the Ministry of Health to local authorities draws attention to certain changes in the regulations affecting milk suspected to be a source of disease. A distinction is now made between instances in which a medical officer of health (*a*) has evidence which satisfies him, and (*b*) has reasonable grounds for suspecting, that a person is suffering from a disease thus caused, or that milk is infected with such disease. In case (*a*), notice may be given, either stopping the sale, etc., of the milk for human consumption, or making the sale conditional upon the milk being so treated as to satisfy the medical officer that it may safely be used. In case (*b*), however, the notice may only provide for the latter alternative.

* * * * *

Actinomycosis in a Labrador Bitch (*Vet. Rec.* **61.** 586).—Dr. A. Leslie Sheather writes: "In Mr. Forsyth's communication it is said 'canine actinomycosis does not appear to have been reported in this country.' I published a short account of a case with a photomicrograph of the organism in *The Veterinary Record*, October 29th, 1932, Vol. 12, No. 44, p.1312."

ABSTRACT

[Demyelinating Encephalomyelitis in the Dog associated with Anti-Rabies Vaccination. Jervis, G. A., Burkhart, R. L., & Koprowski, H. (1949.) *Amer. J. Hygiene.* **50.** 14–25.]

Although "anti-rabies vaccination" encephalitis has been known to occur in man for many years it has not been too frequently reported in the dog, but there are a number of important references all of which are given in this article. This paper is a detailed study of four cases of neuroparalytic accidents following anti-rabies vaccination in four Great Pyrenees out of a total of 30 St. Bernard and 60 Great Pyrenees which all had been injected with one dose of 10 ml. anti-rabies vaccine. All dogs had been immunised against distemper. The animals first showed neurological signs between the 14th and 20th day after vaccination which were mainly those of progressive motor paralysis with tremors and myoclonia. The dogs were killed and examined at variable periods after onset of illness. No infectious agent was demonstrated in the C.N.S. by inoculation of material into dogs, guinea-pigs or mice and no anti-brain antibodies in the sera of dogs tested.

The lesions found in the nervous system following a meticulous examination were clearly those of an acute multiple demyelinating encephalopathy but the sequence of events leading to the lesions was obscure. The lesions were certainly not caused by the rabies virus nor could any other virus be identified by intracerebral passage in mice.

There were striking similarities between this canine encephalopathy and the demyelinating lesions seen in monkeys following the injection of brain emulsion incorporated in adjuvants. Allergic factors might thus play a role although the mechanism is still not understood. The lesions are also quite comparable to those which have been frequently observed by many workers in varieties of spontaneous demyelination in the dog and to which much reference has been made in these columns during this past year.

J. R. M. I.

NOTES AND NEWS

Diary of Events

Sept. 27th, 28th and 29th.—Meetings of **Council, R.C.V.S.**, at 10, Red Lion Square, W.C.1.

Sept. 27th.—Summer Meeting of the East Midlands Division, N.V.M.A., at Messrs. Boots Hill Farm, Thurgarton, Notts., 12.30 p.m.

Sept. 27th.—Meeting of the West of Scotland Division, N.V.M.A., at Glasgow (North British Station Hotel), 2.30 p.m.

Sept. 28th.—Meeting of the Midland Counties Division, N.V.M.A., at Droitwich (Raven Hotel), 2.30 p.m.

Sept. 30th.—Meeting of the South Wales Division, N.V.M.A., at Cardiff. (*See Notice*).

Oct. 2nd.—Meeting of the Central Veterinary Society at the Royal Veterinary College, N.W.1, 2 p.m.

Oct. 5th.—Meeting of the Lancashire Division, N.V.M.A., at Chester (The Queen Hotel), 2.30 p.m.

Oct. 5th.—Special Meeting of the North Wales Division, N.V.M.A., at Bettws-y-Coed (Glanaber Hotel), 2 p.m.

Oct. 7th.—Extraordinary General Meeting of the Royal Counties Division, N.V.M.A., at Reading (Caversham Bridge Hotel), 2.30 p.m.

Oct. 11th.—Scientific Meeting of the Zoological Society of London, Regent's Park, N.W.8, 5 p.m.

N.V.M.A. Committee and Council Meetings

The following are the arrangements for meetings of Committees and Council of the Association to be held in London in November:—

Tuesday, November 15th:

11 a.m.—Parliamentary and Public Relations Committee.
2 p.m.—Organising Committee.
4.15 p.m.—Home Appointments Committee.

Wednesday, November 16th:

10 a.m.—Veterinary State Medicine Committee.
2 p.m.—General Purposes and Finance Committee.

Thursday, November 17th:

11 a.m.—**Meeting of Council.**

Friday, November 18th:

10.30 a.m.—**Special Meeting of Council.**

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Repetition of Prescription

The attention of Members, R.C.V.S., is drawn to the standard practice of pharmacists and chemists of permitting repetition of prescriptions unless they consist of Schedule IV Poisons, Dangerous Drugs or Penicillin and its Preparations, or unless the prescription is clearly marked "not to be repeated."

If prescriptions are not so marked they may be repeated indefinitely and thus it would be possible to circumvent control of the product for which a prescription is necessary.

Veterinary surgeons are therefore advised to mark all prescriptions "not to be repeated" except when it is the intention to make an open prescription.

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The Norwegian Veterinary Conference, 1949

As the nominee of the President, the Senior Vice-President, Dr. R. F. Montgomerie, represented the N.V.M.A. at the annual meeting of the Norwegian Veterinary Association held in Oslo on September 4th and 5th. He was accompanied by Mrs. Montgomerie.

Throughout the period, appreciation of the presence of a delegate from Britain was obvious and Dr. Montgomerie was elected an honorary member of the Norwegian Association. The other veterinarian so honoured was Professor Brandt, Principal of the Norwegian Veterinary College and for a period of years President of the Association. At the annual dinner, Dr. and Mrs. Montgomerie, Major and Mrs. Wilhelmsson of Sweden and Dr. Plum from Denmark were the guests of honour at a delightful function, when the President, Mr. H. O. Lund-Larsen, paid tribute to the manner in which Norwegian veterinary surgeons were received and entertained during the recent International and National Congresses in London.

Dr. and Mrs. Montgomerie extended their stay to see something of the beauties of Southern Norway under the guidance of Professor and Mrs. Brandt and Professor and Mrs. Bugge-Naess. Professor Flatla was their guide on a tour of the small but efficient Veterinary College and Professor Holth and his staff on a visit to the State Serum Institute. Dr. L. Slagsvold, the Chief Veterinary Officer, presided at a dinner given by the Ministry of Agriculture in honour of our representative and throughout a week filled with pleasure Mr. R. Vollan, Secretary of the Norwegian Veterinary Association, and known to many of our members through his attendance at our Congresses in 1948 and 1949, found time to be the "friend" of the overseas guests. The ease with which the English language is understood in Norway and the obvious delight with which our representative was received, made contact easy to maintain and the outstanding impression was that this visit had done much to cement the friendship between the professional bodies in the two countries.

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PERSONAL

Appointments.—The following appointments in the Colonial Veterinary Service are announced: Of Mr. J. R. Gibbs, M.R.C.V.S., as Veterinary Officer, Uganda, and of Mr. P. J. Moorhead, M.R.C.V.S., and Mr. J. A. C. Stewart, M.R.C.V.S., as Veterinary Officers, Tanganyika.

. . . . .

Births.—McLaren.—On September 4th, 1949, at Stepping Hill Maternity Hospital, Stockport, to Joan (*née* Addison), wife of I. S. McLaren, M.R.C.V.S., a son—Michael William.

Hanbury.—On September 11th, 1949, at Robsacks, Weald, Sevenoaks, to Eileen and Denis Hanbury, a daughter—Alison Diana.

. . . . .

Marriages.—Skinner—Hanson.—On September 10th, 1949, at St. Mark's Church, South Norwood, Hubert H. Skinner, M.R.C.V.S., to Mary L. Hanson.

Slee—Chittleburgh.—On June 9th, 1949, at St. Peter's, Gt. Yarmouth, Alan Slee, M.R.C.V.S., only son of Mr. and Mrs. W. J. Slee, of Edinburgh, to June Thelma, only child of Mr. and Mrs. Chas. F. Chittleburgh, of Control Commission, Dusseldorf, Germany. The Vicar of Gt. Yarmouth, Canon L. J. Baggott, M.A., officiated.

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Veterinary Surgeon's Sheep Breeding Success.—Mr. Wm. Wallace Peggie, J.P., F.R.C.V.S., practitioner at Biggar, Lanarks, who also farms the Blackface Sheep farm of Campshead Crawford, Lanarkshire, had the distinction of breeding and selling the highest priced lamb ram at the Annual Sale of Blackface Rams held at Lanark on September 6th. The lamb fetched the great price of £450. Mr. Peggie had also the highest average for lambs sold, £128 10s. for eight lambs. This is the second year Mr. Peggie has had this distinction, as last year at the same sales he topped the sale with a lamb sold at £300.

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R.C.V.S. OBITUARY

Forbes, Alexander Cairns, Coley Cottage, East Harptree, Bristol. Graduated Glasgow, July 28th, 1885. Died September 14th, 1949; aged 84 years.

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International Veterinary Congresses

Appointment of Sub-committees by the Permanent Committee

Arising out of the recent 14th International Veterinary Congress the Permanent International Committee has appointed two Sub-committees.

The first is to enquire into the strengthening of international veterinary organisation and the provision of the necessary funds.

The members of this Committee are:—

Sir D. Cabot, President, Permanent Committee.
Professor Dr. L. de Blieck, Secretary, Permanent Committee.
Professor T. Dalling, The Chief Veterinary Officer, Great Britain.
Dr. W. R. Wooldridge, Scientific Director, The Animal Health Trust.
Mr. G. Petersen, Director, Veterinary Service, Copenhagen.
Professor G. Verge, Paris.
Dr. R. Willems, Director of the Belgian State Diagnosis Laboratories.

The second Sub-committee is concerned with the nomenclature of animal diseases and its members are:—

Mr. W. A. Pool, Director, Commonwealth Bureau of Animal Health.
Professor T. J. Bosworth, Professor of Pathology in the Royal Veterinary College, London.
Dr. W. R. Wooldridge, Scientific Director, The Animal Health Trust.

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FIFTH INTERNATIONAL CONGRESS OF ANIMAL HUSBANDRY

(Paris—November 3rd to 10th, 1949)

The Fifth International Congress of Animal Husbandry, which is being held in Paris from November 3rd to 10th, 1949, is being organised by the Association Française de Zootechnie and is sponsored by the French Ministry of Agriculture and F.A.O. Professor André M. Leroy is the Secretary-General.

There will be four main sections. The first is concerned with methods of evaluating energy and protein contents of feeding-stuffs and particular attention will be given to the possibility of agreeing on some form of international feeding standards for livestock. The second section will deal with type and conformation in relation to production and, in particular, a definition of the characteristics of the ideal dairy cow. Section III will deal with the organisation of artificial insemination centres and the methods of selection of bulls. The fourth section is concerned with the co-ordination of animal husbandry research. In each section the principal papers will be given by invited persons. For Great Britain these are:—

Section I.—Professor S. J. Watson, Edinburgh University.
Section II.—Dr. J. Hammond, School of Agriculture, Cambridge.
Section III.—Mr. J. Edwards, Milk Marketing Board, Thames Ditton.
Section IV.—Mr. J. P. Maule, Commonwealth Bureau of Animal Breeding and Genetics, Edinburgh.

During the Congress the Constituent Assembly for a European Association for Animal Production will meet for the purpose of adopting a constitution and inaugurating the Association.

At the end of the Congress two excursions will take place: The first will last three days (November 11th to 13th) and will

visit centres in Normandy to see dairy cattle, horses, pigs and sheep, and will include a visit to the Stud Farm at Le Pin.

The second will last two days (November 11th and 12th) and will visit the Côte d'Or and Chatillonnais area where beef and dairy cattle will be seen. This is a poorer dairying region than Normandy.

The Congress is open to everyone and, provided not less than 20 people travel from Great Britain, there will be a reduction of 20 per cent. on French railway fares.

Particulars regarding travel arrangements and accommodation can be obtained from Messrs. Thomas Cook and Sons who are the official agents. Further information can be obtained from Mr. J. P. Maule, Commonwealth Bureau of Animal Breeding and Genetics, King's Buildings, West Mains Road, Edinburgh, 9.

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SLAUGHTERHOUSE POLICY DEMAND

Slaughterhouse conditions and administration (states *The Farmers' Weekly*) were criticised by Mr. Alfred Wade, Chief Sanitary Inspector, Nottingham, when he addressed the annual conference of the Sanitary Inspectors' Association at Eastbourne. Improved meat inspection services had been brought about by the Ministry of Food's concentration on slaughtering. It could not be said that all slaughtering establishments now in use were entirely satisfactory as regards situation, planning and construction. Very many others were so old, cramped and unsuitable for slaughtering purposes that their abolition was both desirable and necessary.

Opinion against the return of pre-war slaughtering conditions was strong, and it was desirable that Ministry policy should be declared at the earliest opportunity.

The concentration of the knackery trade on the lines of the central slaughterhouse establishment was advocated by Mr. Wade. There had been, he said, a "spreading out" of the knackery trade which appeared contrary to good administration.

Concluding, Mr. Wade said that much remained to be done in connection with the improvement of slaughtering accommodation, food storage, preparing and manufacturing premises and of food hygiene generally.

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POULTRY STOCK IMPROVEMENT CONGRESS

The Seventh Stock Improvement Congress will be organised by the Poultry Association of Great Britain and will be held at the Midland Hotel, Manchester, on Wednesday, November 9th, starting at 2 p.m. The subject of the Congress will be "Laying Trials: Their Potentials and Weaknesses," and the following aspects of the matter will be dealt with by various speakers.—The Practical Scope of Laying Trials from the Test Management's Viewpoint; The Value to the Commercial Side of the Industry of Laying Tests; The Value of Laying Tests to the Breeding Side of the Industry; The Weaknesses of the Laying Trial from the Breeder's and Commercial Poultry Man's Viewpoints.

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BOOTLE BUTCHERS REFUSE "CYST BEEF"

In its issue of September 15th *The Meat Trades Journal* reports that, at a special meeting on September 7th, the Bootle Retail Butchers' Council unanimously adopted a resolution refusing to accept suspect cyst beef (*cysticercus bovis*), as, in their opinion, it was unsuitable for ration meat. Mr. T. Braithwaite, who presided, said he had already refused to accept 32 beef quarters, valued £293, on the ground that there was a legal ruling that the chairman of an R.B.C. should use all diligence to see that the meat for distribution was in reasonable condition. He did not consider that suspect meat, frozen hard for 21 days at 15° below zero in order to kill the parasite, was a fit commodity for the butcher to handle. Furthermore, it was unjust for the Ministry to plant this meat on the butcher.

Mr. E. O. Shipton, who quoted from a text-book on veterinary science, contended that heat treatment was the only safe means of securing that suspected meat could be made fit for human consumption; he questioned the efficiency of hard freezing. The R.B.C. had been threatened that if this meat was refused, it would not be replaced, which meant so far as this particular consignment was concerned, a cut of 3 to 4 per cent. in the permit quantity, or a loss of 7d. to 8d. in the £ per shop. If the authorities were so confident about the soundness of this meat, why was it not also sent to school canteens and hospitals? What butchers had to decide was: Would they accept a cut in their permits rather than have this meat?

Another member pointed out that if the meat was contaminated, it would be destroyed—the inspectors would see to that. All that butchers could say was that it was under suspicion, and that being the case, it ought not to be issued for rations.

LORD BOYD-ORR URGES WORLD FOOD PACT

At St. Gergue, Switzerland, recently, Lord Boyd-Orr urged vast projects for under-developed countries to help realise the scientific possibility of doubling world food production in 25 years. "World peace would be in sight if the nations were as eager for a world food pact as they are for war pacts," he told 50 delegates from eleven countries in the village hall of this resort high in the Jura mountains. Lord Boyd-Orr, who was first Director-General of the United Nations Food and Agriculture Organisation, was addressing representatives of the World Union of Peace Organisations, a non-governmental affiliate of the United Nations.

The greater part of the effort to double world food production must be made in the under-developed countries, he said. "There would be needed vast quantities of industrial products for flood control schemes like the Tenessee Valley Authority to stop erosion, for irrigation schemes, agricultural implements, fertilisers and transport and for consumer goods to exchange for the food purchased. Credits would be needed to enable poor countries to obtain the necessary equipment and ensure that the additional food produced would be purchased."

Lord Boyd-Orr urged establishment of a world food reserve to "even out the effects of good and bad harvests" and help stabilise food prices at fair levels for both producers and consumers. The world population had increased by 200 million since 1939, while world food production in 1948 was "not quite up to the pre-war level," he said.—*Reuter.*

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CANINE HYSTERIA UNRELATED TO INGESTION OF 'AGENISED' FLOUR"

In a note, under the above heading, in its September issue, *Veterinary Medicine* observes: "Hysteria (fright disease) has been rife in France; all ages and breeds of dogs being equally susceptible. Dogs that received dog biscuits and mongrels living on kitchen scraps were affected alike. It was concluded that biscuits do not play any part in causing canine hysteria. Moreover, flour in France is not subjected to any form of bleaching or improving process. The cause of canine hysteria in France must be different from that of Mellanby's dogs. (*Brit. Med. J.* Abst. *Vet. Bull.*, page 167, April, 1949).

"Fright disease (hysteria) in dogs has been prevalent in the United States for many years, although less prevalent in the last decade than formerly. There is no possibility that it was caused by 'agenised flour,' since as everyone familiar with the dog food industry knows, bleached flour has never been used in the manufacture of dog biscuits in this country. Yet when the incidence of this disease was at its height it was precisely the dogs fed exclusively or largely upon commercial dog biscuits in which the incidence of the ailment was highest. Modified formulations, but containing the same flour as before, to a large extent suppressed the disease among dogs fed upon commercial biscuits. . ."

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TOXIC FACTOR IN BLEACHED FLOUR

"Not quite three years ago Sir Edward Mellanby's first report[1] on the experimental production of canine hysteria was published in the *Journal*," observes *The British Medical Journal* in its issue of September 17th, and continues: "Hysteria was produced in dogs and subsequently in ferrets[2] by feeding them with flour treated with agene (nitrogen trichloride), the flour improver and bleacher which has been in common use in this country and the U.S.A. for the past 25 years. Later work on agene-treated flour fully confirmed Mellanby's conclusions and was discussed at the time in these columns.[3] These confirmatory studies led the Food and Drug Administration of the United States Government to prohibit the use of agene, a prohibition which came into force as recently as August 1st.

"It was subsequently pointed out by British and American workers that the toxic agent was formed from the protein of the wheat and particularly from the gliadin fraction.[4] Since Mellanby's first observations on the subject there has been increasing interest in the identity of the toxic substance responsible. A great deal of work has been carried out by Moran and his co-workers[5] at the Cereals Research Station of the Research Association of British Flour Millers and also by other workers.[6] This has now been rewarded by the isolation at St. Albans of a crystalline substance which either is or contains the toxic factor.[7] The crystals are of needle-like appearance, melt sharply with decomposition at a tem-

perature of 232° C. (uncorrected), and their biological activity is unaffected by further recrystallisation. As in previous work, the maize protein, zein, has been used as the starting point. In the normal way it would be said that this crystalline isolate was a pure substance, and that it only remained to establish its composition and chemical identity. But the indications are that it will prove to be a peptide; and with peptides, as with proteins, there has been a recent reminder that apparently 'pure' and homogenous crystals may turn out to be mixtures of different substances. None the less, this is an important advance, and the further progress of this work will be awaited with interest."

1 *British Medical Journal*. (1946.) **2.** 885.
2 *Ibid*. (1947.) **2.** 288.
3 *Ibid*. (1948.) **1.** 350.
4 *Ibid*. (1948.) **1.** 843.
5 Bentley, McDermott, Pace, Whitehead, & Moran. *Nature*. (1949.) **163.** 675.
6 Butler & Mills. *Nature*. (1949.) **163.** 835.
7 Bentley, McDermott, Pace, Whitehead, & Moran. *Nature*. (1949.) **164.** 438.

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ARTIFICIAL INSEMINATION IN THE U.S.A.

With respect to universal adoption by breeders, artificial insemination of dairy cattle has made the most rapid strides of any development to date for the improvement of livestock. The first artificial breeding association in the United States was organised in New Jersey and began operations in May, 1938. Ten years later (January 1st, 1948), there were 963 associations throughout the nation, with 224,493 herds enrolled, totalling 1,743,327 cows.

In 1939, there were 228 cows enrolled per bull kept in association studs; in 1948, due to greater dilution of the semen and greater volume of cows to be inseminated, one bull was kept for each 999 cows. About 24 per cent. of the sires used in this work are proved, and their daughters give an average of 433 lb. of butterfat as compared with 407 lb. for their dams.

Artificial breeding will not entirely replace herd sires on the larger dairy farms, but it will extend their use. Cost per artificial service ranges from $5.00 to $7.50. Local organisations are rapidly giving way to central or federated types, where a central stud supplies semen to 12 or even 100 local units.

The insemination association must settle cows with a high degree of efficiency if it is to succeed. Efficient operation can result in 60 per cent. of the cows settling the first service. In the case of persistent non-settlers, the cause should be determined, and if veterinary attention is the answer, it should be provided.—H. A. Herman (U.S.A.), *Guernsey Breeders' J.*, May 1st, 1949.

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GLASGOW VETERINARY COLLEGE

At the end of this month the Glasgow Veterinary College, founded as a private enterprise by the late Principal James M'Call, and later run as a public institution, will cease its separate identity. From then onwards the College will be taken under the wing of the University of Glasgow.

Commenting on this development, the *Farming News and North British Agriculturist* says, in its issue of September 16th: "This will be a new chapter in the history of a College which has had many vicissitudes. Just about 25 years ago the College seemed to be marked down for extinction. That fate was probable after the Constable Committee was instrumental in having its State grants withdrawn. But the Chairman of Governors of those days, the late Professor John Glaister (father of the professor who carries on that name to-day) was a bonny fechter and he led his colleagues into active resistance of this edict. It was not till the middle of the war, however, that his successor in the chair, the late Mr. Alex. Murdoch, was able to interest Mr. Tom Johnston, then Secretary of State for Scotland, in the welfare of the College and got the State grants restored.

"We are not sure yet what the transfer of the College to the University will mean in a physical sense. We believe that it is all to the good of the old College that it should come under the wing of the University more closely. But we should hope that the University will be able at an early date to have the whole College's activities placed in a more suitable environment than Garnethill. The University now own the Garscube Estate. Whether we shall see the College transferred to such a rural site near to the city and see it equipped with a suitable field hospital is an interesting speculative question.

"Perhaps some light on its future will be shed at the 'farewell' lunch which is to be held on September 30th, at which the speakers will include the Secretary of State for Scotland, Lord Provost Warren, Sir Hector Hetherington (Principal of the University) and Sir Patrick Laird."

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LEGAL NOTES

Fine for Killing Protected Birds.—At Altrincham, Cheshire, John William Parry, of Hale Lodge, Grove Lane, Hale, a magistrate and a member of the Cheshire County Council and of the Hale Urban Council, appeared to answer a summons alleging that he knowingly and wilfully killed two great crested grebes contrary to the Wild Birds Protection Acts, at Hale last July. He was fined 20s. and was ordered to pay £3 10s. 6d. in advocates' and witness fees.

Mr. H. C. Riches, prosecuting for the R.S.P.C.A., said that a pair of great crested grebes took up their home on Gibson's Pool, Hale, last March and a family of four was bred. On July 13th shots were heard and a dog was seen to fetch a bird out of the water. Three men were in a car which was driven away.

When Parry was seen by Inspector Drake, of the R.S.P.C.A., he said that he had acted under instructions of the Hale U.D.C., which was concerned about the loss of fish. To a police officer it was alleged that he said that for some time past the Council had had complaints that the birds nesting on the fishing pool—known as divers—had been eating fish at the rate of 150 a day. The pool had recently been stocked at great expense, and at that rate there would soon be no fish left. A meeting of the Hale U.D.C. was called, and it was decided that the divers should be destroyed. He (Parry) went with two other men to the pool. It was with the full consent of the Council that the birds were destroyed. They were not great crested grebes but divers.

Major A. W. Boyd, a Cheshire naturalist, replying to Mr. E. Barlow, for the defence, said that the great crested grebe type of bird ate little fish.

Mr. Barlow submitted that the Act did not destroy the right of the property owner to protect his own property, and that the Council were entitled to protect the fish they had bought, but the magistrates overruled that contention.

Noel Thomas, clerk to the Hale Council, said in evidence that the Council spent about £40 a year on stocking the pool with fish. The fishing rights were let to anglers, and the Council had received complaints about the birds eating fish. The matter arose on a report by the surveyor, and members of the Council decided, while giving no instruction to the surveyor, that the only way was to shoot the birds. Cross-examined, he said that no resolution was passed on the matter.

The Chairman (Judge Rhodes) said that the magistrates' decision to convict was unanimous.

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FOWL PEST

The Poultry Association of Great Britain has urged that imports of table poultry from countries on the Continent where fowl pest exists should cease; much of the imported poultry has been coming from Hungary. The Minister of Food has informed the Association that extensive arrangements have now been adopted in Hungary to control and eventually eradicate fowl-pest, including the vaccination of all domestic poultry over six weeks. In addition, the Hungarian authorities have agreed to take certain measures considered essential to safeguard the trade with Britain, notably the nomination of approved packing plants, submission of birds only from areas where all domestic poultry over six weeks have been vaccinated, the embargo of poultry from holdings where fowl pest exists or has existed during the previous four weeks, and the vigorous disinfection of all appliances, vehicles, etc., used for the export trade. It has been arranged that a small proportion of the carcases of imported poultry shall, after arrival here, be tested for the presence of the virus of fowl pest so that additional measures may be adopted where necessary to prevent the introduction of infection. Meantime it has been decided to restrict the distribution of eviscerated poultry to certain industrial areas. The Minister also says he is satisfied that any risk of introducing fowl pest through the medium of imported poultry carcases has, in fact, now been reduced to an absolute minimum, and that the arrangements for inspection and distribution in this country should make it possible for the Government to keep a close watch on the position.

Movement of Poultry Carcases from the Orkney Islands

The Ministry of Agriculture and Fisheries announces that, as a further precaution against the spread of fowl pest from the Orkney Islands to the rest of Great Britain, an Order has been made prohibiting the movement of poultry carcases from the Islands to the mainland unless the feathers, head, feet, crop and internal organs (other than the kidneys) have been removed. The Order is supplementary to that which came into operation on September 13th and which prohibited the movement of live poultry from the Orkney Islands to any other part of Great Britain.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.

THE PSYCHOLOGICALLY ABERRANT CASE

Sir,—Major Bridgeman's letter in your issue of September 10th underlines the necessity for greater attention to be paid to psychological phenomena in animals, particularly dogs.

In reply to his enquiry, I should place the following case in the same category as that of the Boxer bitch which is described. Unfortunately, owing to the owner's very transient stay in this district, this case was seen only once, consequently nothing is known of its outcome.

The subject was a ten months' old Alsatian dog, in my view an exceptionally sound specimen both physically and temperamentally apart from this one foible.

The symptoms occurred in one place only, the owner's back garden—the dog was absolutely normal in every other environment. Symptoms comprised maniacal tail-chasing, the dog seizing the base of its tail viciously in its mouth and circling continuously until dropping exhausted. The chasing was carried out in both clockwise and anticlockwise directions.

On being let into the back garden—incidentally there was no reluctance to go into it—the dog would be normal for about 30 seconds or for a longer period if his attention could be kept fixed on something by playing with him; left alone he would, within a few seconds, pause, glance round apprehensively once or twice, then seize his tail and start off. It required a good deal of interference to cause him to desist from the circling. If left he continued until exhausted, dropped to the ground for a short time, only to resume on getting rested.

The garden in question was of fair size and not closely fenced in, so that the manifestation was clearly not claustrophobic in origin.

I need hardly say that all physical causes such as anal gland trouble, external parasites, etc., were ruled out before classing the case as a psychological one.

With Major Bridgeman I should be interested to hear other practitioners' views on similar cases and treatment.

Yours faithfully,

Joan O. Joshua.

78, Brentway,
Finchley, N.3.
September 15th, 1949.

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PROCEEDINGS OF COUNCIL, R.C.V.S.

Sir,—It is a long time since we have been able to read an account of the proceedings of the Council of the Royal College of Veterinary Surgeons. In the past these proceedings used to be published in *The Veterinary Record* and we therefore had knowledge of the way in which our elected representatives conducted our affairs.

Many of our colleagues have spoken to us on this matter and we deplore the absence of these reports.

May we ask the reason for their suppression and enquire if the Editorial Committee is unaware of this state of affairs or, if it is aware of them, has made any effort to rectify matters?

Yours faithfully,

P. Robert Turner and George Nixon.

76, Risbygate, Bury St. Edmund's.
September 15th, 1949.

[Publication of the proceedings of the quarterly meetings of Council, R.C.V.S., which previously had been made regularly in our *Supplement*, ceased abruptly with the issue of November 17th, 1945, in which were recorded the minutes of the meeting held on September 21st of that year. Members, R.C.V.S., as typified by our correspondent, in the absence of any information to the contrary, may well be inclined to attribute at least some of the blame for this long-continued omission to the Association and, more particularly, to the Editorial Committee. We wish, therefore, to take this opportunity of stating that, whatever factors have contributed to the non-appearance of these reports—and it is well understood that the R.C.V.S. secretariat has had many difficulties with which to content during the period mentioned—omission to press for the opportunity of fulfilling what the Committee regards as its obligation to publish these proceedings is not one of them. On the contrary, many efforts have been made to secure the restoration to our *Supplement* of this sole source of information as to the business conducted by the Governing Body of the profession, but without success other than that represented by the receipt of reports of special meetings of Council and of Council sitting as Registration Committee.—*Editor*.]

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APPOINTMENT OF LECTURER IN ANIMAL HUSBANDRY AT BRISTOL

Sir,—I regard Mr. Grant's letter under the above heading as not only impertinent but as typifying that narrow parochialism which, from the days of Coleman onwards, has been the bugbear of the profession. The University of Bristol has seen fit, in its wisdom, to found a Veterinary School, and it is the business of this School to provide the best teaching for its students, whether this standard be available inside or outside the profession—and to provide it without being swayed by narrow criticisms from either side of the border.

I have no doubt that in this case the post can be adequately filled from within the profession, which now contains great and versatile talent. This does not, however, invalidate the contention in my first paragraph—that the first duty of the University is to its students, *i.e.*, to the future and not to the present.

Yours faithfully,

Chipping Norton, Oxon. Paul Crosfield.
September 19th, 1949.

DISEASES OF ANIMALS ACTS, 1894 to 1937, and AGRICULTURE ACT, 1937 (PART IV).

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Fowl Pest	Parasitic Mange*	Sheep Scab	Swine Fever
August 16th to 31st, 1949	8	2	5	—	—	—
Corresponding period in—						
1948	5	—	10	—	2	1
1947	4	—	20	—	6	1
1946	1	—	—	—	2	9
Jan. 1st to Aug. 31st, 1949	130	13	357	—	29	5
Corresponding period in—						
1948	67	—	240	1	33	23
1947	67	103	716	1	41	20
1946	65	31	—	7	41	306

Note.—The figures for the current year are approximate only.

* Excluding outbreaks in Army Horses.

Tuberculosis (Attested Herds) Schemes

The number of Attested Herds, *i.e.*, herds officially certified as free from Tuberculosis as at August 31st, 1949, was as follows:—

England	Wales	Scotland	Total (Great Britain)
16,817	13,415	11,849	42,081